



Network Research Team (NRT) PITAC Briefing

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January 14, 2000



Outline

- Mission
- Participation
- Accomplishments
 - Research Coordination
 - Workshops
 - Outreach



NRT Mission

- The NRT *coordinates networking research* activities of the LSN member agencies, including activities associated with Thrust 1 of the NGI Initiative.
- The NRT *works with LSN to jointly implement* a comprehensive program in critical research areas (e.g, QoS, privacy and security, multicasting).
- NRT *members exchange information* about research activities and results through meetings, workshops and other forums. These collaborations are used *to identify research needs and agendas* while planning and implementing a balanced program of individual agency and multi-agency activities.



NRT Participants

- DARPA (Mari Maeda – co-chair)
- DOE (Rich Carlson)
- NASA (Marjory Johnson, Kevin Jones)
- NIST (Doug Montgomery – co-chair)
- NSF (Karen Sollins, Darleen Fisher)
- NCO (Grant Miller)
- Contact: lsn-nrt@ccic.gov



Summary of Research Directions

Current Thrusts:

- Optical Networks
- Quality of Service
- Security
- Multicast
- Middleware
- Network Management
- Growth Engineering

Emerging Areas:

- Wireless
- Pervasive Computing
- Network Complexity
- Programmable Networks
- Modeling and Simulation

Research Areas (cont'd)

- **Optical Networks** – λ routing / switching, transmission technology
- **Quality of Service** – service architectures, routing / signaling, traffic engineering, congestion control, sensitivity analysis
- **Security** – packet level, key management, certificate infrastructure, network infrastructure protection, multicast security
- **Multicast** – reliable multicast, inter domain, security
- **Middleware** – coordinated resource allocation / scheduling, authentication and access control.
- **Network Management** – routing / peering control, fault tolerance, policy management
- **Growth Engineering** – measurement infrastructures, traffic / topology modeling



NGI Research Matrix

Agency Research Area	DARPA	NSF	DOE	NASA	NIST
Optical Networking	X				X
Quality of Service	X	X	X	X	X
Security		X	X		X
Multicast	X		X	X	
Middleware			X	X	X
Network Management	X		X	X	
Growth Engineering	X	X			

See Research Appendix for Specific Projects.



Activities and Accomplishments

- Coordination of programs / proposal reviews
 - **NSF** - 98 (8/34 proposals), 99 (14/56 proposals)
 - **DARPA** - 98 (28 proposals), 99 (16 proposals)
 - **DOE** - 99 (12/50 proposals)
 - **NASA** – 99 (5 proposals)
- Co-funding of some projects/workshops



Activities and Accomplishments

- Joint Workshops & PI Meetings
 - NRT/HPNAT Bridging The Gap - Aug 1999
 - Smart Spaces – Jul 1999 - (DARPA, NIST, NSF)
 - DOE PI Meeting – Oct 1999
 - Internet Economics – Dec 1999 – (NSF, DARPA)
 - DARPA / NSF / NIST PI Meeting – Dec 1999



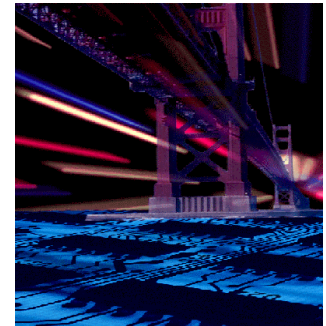
Accomplishments and Planned Activities

- Information Dissemination - Presentations & Demonstrations
 - Netamorphosis
 - SC 98 & 99
 - IEEE Communications Paper
 - NGI Lecture Series
 - (Multicast over NGI testbed and webcast over the Internet)



Selected Accomplishments

- Bridging the Gap Workshop
 - Examined landscape of emerging NGI network technologies
 - 100 network technologists from NGI, I2, industry
 - QoS, Multicast and Security technology tracks
 - Developed technology roadmaps
 - **Technology readiness** – state of research and development
 - **Deployability / usability** – mapping to NGI networks
 - **Utility / effectiveness** – mapping to NGI applications
 - Identified critical roadblocks / outstanding research issues.
 - (see <http://www.nren.nasa.gov/btgreport>)





Selected Accomplishments

- DARPA / NSF / NIST PI Meeting
 - Approximately 130 Participants
 - Presentations of ~75 projects
 - Technology demonstrations
 - Research Areas: optical networks, QoS, network management, middleware, growth engineering
 - Sessions Netcast over testbed networks and real video access over WWW.
 - Focus panels: future of network testbeds, speed scalability, network monitoring and analysis